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ABSTRACT

A project developed, field tested, implemented, and disseminated a management system, support materials, and references for a self-paced individualized instructional program in automotive mechanics and food services. During the program, the Planwriter component of the SAGE/Compute-a-Match Assessment System was used to develop a management system for self-paced individualized instruction. A sequence of instruction was outlined, with each unit identified and objectives and competencies produced for them. An inventory of instructional materials on hand was taken and a search for additional materials was made. (A complete learning activity package--LAP--for each unit of instruction was to be developed in automotive mechanics; however, only basic electricity was completed during the project.) Lectures were videotaped, and illustrations, filmstrips, transparencies, slides, and any other teaching strategies involved for each unit were recorded. A series of main ideas were written for each unit. Pretests and posttests were used to screen students into and out of units. Twenty-two students were involved in field testing, and all were very positive about using the LAPs. As a result of the project, students can progress at their own pace through these training programs. (Ten appendixes, which constitute three-fourths of the report, include the following: project documents management system; resource inventory for automotive mechanics and food services; LAP checklist; sample LAP; pretests; posttests; job sheet; student evaluation form; list of materials produced; and records of visitations from other schools.) (KC)

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FINAL REPORT

MULTIMEDIA APPROACH TO SELF-PACED INDIVIDUALIZED INSTRUCTION IN AUTOMOTIVE MECHANICS AND OTHER VOCATIONAL PROGRAMS

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MULTIMEDIA APPROACH TO SELF-PACED INDIVIDUALIZED INSTRUCTION IN AUTOMOTIVE MECHANICS AND OTHER VOCATIONAL PROGRAMS

Introduction

Vocational-technical education has addressed the individual needs of students for many years. At the present time Ozarka Vocational Technical School enrolls students regardless of their abilities and trains them as their abilities allow. However, because the training programs are eleven months in length, the students are required to attend class for eleven months even though they may have completed the required competencies in less time. Therefore, in most programs, the "average time for completion" is the standard to be achieved at graduation.

In the past Ozarka Vocational Technical School was ineffective in its efforts to evaluate the skills of the entering students. As a result, the School found it difficult to determine when the student had, in fact, mastered the knowledge and skills necessary for successful entry into the occupation of his or her choice. Substantial work has been done in the past few years to refine and to develop task accomplishments, competency profiles, and standardized curriculum. These lists of competencies made a significant basis for the development of self-paced individualized programs.

Testing programs implemented at Ozarka Vocational Technical School indicated a wide range of abilities and aptitudes displayed by entering students. Substantial numbers of applicants for enrollment in the Automotive Mechanics Program had high levels of both ability and aptitude; however, the applicant with lower abilities and skills should

also be provided with service and training. This range of ability and aptitude was creating problems for all levels of students. The more gifted students were getting frustrated and bored when the training program did not move forward as rapidly as they learned and developed skills. At the same time, the lower-level students got frustrated at their inability to move through the material and assignments as rapidly as was required to maintain the same pace as their peers.

Due to the ability range on either side of them, the average students had difficulties. They needed to move faster than the slow student and could not move as rapidly as the more gifted students. Traditional methods were not solving this problem. The current system in use was ineffective since students were being maintained in school just to meet time requirements without correlation to the skills being taught.

The system in use at the time resulted in less than full utilization of the facilities and resources, making the development of a self-paced individualized program essential if training was to be cost effective and efficient.

When the project began, the focus was on the Automotive Mechanics Program. As the project developed, the Food Services Program was included. Therefore, this report will include the work completed in the Automotive Mechanics and Food Services Programs.

Objectives

The project was designed to develop, field test, implement, and disseminate a management system, support materials, and references

that would accommodate a self-paced individualized concept in Automotive Mechanics and other vocational programs.

Specifically, the project objectives were to:

1. Develop a management system for self-paced individualized instruction.
2. Identify instructional materials available for self-paced individualized training in Automotive Mechanics.
3. Develop materials needed for the self-paced individualized concept.
4. Develop evaluation documents that would assure occupational competence.
5. Implement a field test designed to evaluate and further refine methods and materials to be included in the final report.
6. Disseminate results and recommendations for implementation of the program to other locations.

Procedure

The first objective was to develop a management system for self-paced individualized instruction. The Planwriter component of the SAGE/Compute-A-Match Assessment System was utilized to develop a management system for self-paced individualized instruction (see Appendix A). By marking computer cards, training competencies could be printed as an instructional plan for each individual student, based on his/her career goals. Quarterly progress reports printed a statement of mastery above each competency.

The second objective was to identify instructional materials available for self-paced individualized training in Automotive Mechanics. Together, the instructor and the Project Director outlined the sequence of instruction, identifying each unit of instruction and the performance

objectives and competencies. An inventory of instructional materials on hand was taken (both in the Automotive Mechanics and Food Services Programs) along with a search for additional instructional materials that could be purchased (see Appendix B).

The third objective was to develop materials needed for the self-paced individualized concept. A complete learning activity package (LAP) for each unit of instruction was to be developed in Automotive Mechanics. However, only basic electricity was completed. The basic electricity unit was a priority because all of the trade and industrial programs needed a unit on electricity. The lectures were videotaped, as well as all demonstrations, chalkboard illustrations, filmstrips, transparencies, slides, and any other teaching strategies involved. As soon as the videotaping was completed, the Project Coordinator wrote the information as a series of main ideas of the unit. The exact words of the instructors were used as much as possible so that the students could relate more easily to the instruction.

Short, simple statements were given to the student; key words were omitted with a blank line for the student to complete the statement. If possible, an illustration was used to reemphasize the idea to help those students who are visual learners. The material was compiled into a learning package. A Learning Activity Package Checklist (see Appendix C) was then used to ascertain that the LAP was complete.

Pretests were used to identify students that might have the knowledge that was covered in the unit and, therefore, could possibly advance faster than others. Posttests were given to ascertain that students had mastered the knowledge in the LAP. Also, job application of their skills was tested within each LAP.

In the Food Services Program the format varied from the LAPs of the Automotive Mechanics Program. The instructor's lectures and demonstrations were videotaped, and then a LAP was developed (see Appendix D). This approach was totally competency-based. The LAP included detailed, step-by-step instructions to accomplish a specific competency. The student was given all pertinent information with self-check points. The final evaluation was a performance of the competency.

The fourth objective was to develop evaluation documents that would assure occupational competence. Pretests were given to the Automotive Mechanics students (see Appendix E); these pretests covered all major points of the unit. If a student could pass the pretest with 85 percent accuracy, the student, after consulting with the instructor, could receive credit for this unit. If, however, a student could not pass the pretest with 85 percent accuracy, the student worked through the LAP and took the posttest. Posttests (see Appendix F) were developed before programmed instruction was produced. If a student completed the posttest with 85 percent accuracy, the student moved to the next unit of instruction. Therefore, the program was self-paced. In addition, Job Sheets were developed for evaluation of the performance tasks (see Appendix G).

In the Food Services Program, if the student could perform the competency with 100 percent accuracy, the student did not have to complete the LAP. The student could do the performance test as many times as necessary in order to achieve 100 percent accuracy.

The fifth objective was to implement a field test designed to evaluate and further refine methods and materials to be included in the final report. The field test was completed as students completed the

LAPs. Project personnel closely monitored student progress in the LAPs. Occasionally material in the LAP had to be clarified or additions had to be made. Students were given Student Evaluation Sheets to complete (see Appendix H); these helped project personnel to refine methods and materials for the LAPs.

The sixth and last objective involved in the project was to disseminate results and recommendations for implementation of the program at other locations. A list of materials (see Appendix I) with copies of all materials produced was sent to Dr. Bruce Simpson at the Media Implementation Center in Little Rock for dissemination throughout the State of Arkansas.

Findings

A joint effort which included three instructors (Major Appliance Service, Automotive Mechanics, and Industrial Equipment Technology) and the Project Coordinator developed a basic electricity unit. This unit was designed to be used in all three program areas. Because Ozarka Vocational Technical School has an open-entry policy for enrolling students, students who entered the programs after basic electricity was taught by the instructor were able to learn the material and, therefore, repeat instruction was not required. In addition, the LAP was beneficial to the student who needed to see instructional lectures or demonstrations more than once.

Food Services Program LAPs, were also produced. In the Food Services Program the LAPs made it possible for the instructor to teach the class on a more individualized, self-paced basis. After the initial

videotape was made and the competencies written, the students could, with checkpoints built in, progress through their competencies.

Because of the accomplishments through videotaping and written LAPs in the Food Services area, the students felt freer to move at their own pace. Some needed to see the videotapes on demonstrations more than once; some did not need to see the tape at all as they viewed the actual instructor demonstrate in the laboratory. The end result was that all students could complete the competencies for the program.

Evaluation

Twenty-two students were involved in the field testing. The students completed each LAP, viewing the videotape with the LAP. Others completed parts of the LAPs but these were not tabulated in the field testing.

Those participating in the field testing were asked to complete a Student Evaluation Form. The responses were as follows:

Item 1: Learning is easier using the Learning Activity Packages (LAPs):

Strongly disagree	0
Disagree	2
Not Sure	0
Agree	12
Strongly Agree	8

Item 2: Learning is faster using the LAPs:

Strongly disagree	0
Disagree	3
Not Sure	11
Agree	2
Strongly Agree	6

Item 3: The instructor was available for assistance as needed:

Strongly disagree	0
Disagree	0

Not Sure 0
Agree 9
Strongly Agree 13

Item 4: Information in the LAPs is arranged in a logical order:

Strongly disagree 0
Disagree 0
Not Sure 0
Agree 12
Strongly Agree 10

Item 5: The LAPs are complete (list any that are not):

Strongly disagree 0
Disagree 0
Not Sure 2
Agree 13
Strongly Agree 7

Item 6: The instructions and directions for using the LAPs are clear:

Strongly disagree 0
Disagree 3
Not Sure 0
Agree 8
Strongly Agree 11

Item 7: Visual aids (when applicable) made learning easier:

Strongly disagree 0
Disagree 1
Not Sure 0
Agree 4
Strongly Agree 17

Item 8: The LAPs are about the right length:

Strongly disagree 0
Disagree 1
Not Sure 2
Agree 12
Strongly Agree 7

The following comments were made by the students:

What is the best thing about the LAPs?

1. The information was easy to understand.
2. For me, I could understand it better; and if I didn't understand the material, I could rewind the tape.

3. They make learning easier.
4. It helps me understand the concepts better.
5. Simple to understand.
6. It clarifies the material.
7. The LAPs make good references for us.

What is the worst thing about the LAPs?

1. I feel it could have been a little longer.
2. I don't know any.
3. Nothing I can think of.
4. Not enough time.
5. It can be slightly tiresome and boring.

What is your overall opinion of the LAPs?

1. It was very interesting and fun.
2. It is a good thing, but I would not want to use the LAPs all the time.
3. Very helpful and well organized.
4. Very good.
5. Good program.
6. I feel it is a good program overall, especially for a slow learner.

What error(s) did you discover in the LAPs?

1. None that I could see.
2. On the videotapes, the students' questions should have been repeated by the instructor for clarification. I couldn't hear many of them.
3. Spelling errors can cause problems when you're trying to read it.
4. None that I can tell.
5. Some directions not clear as where to proceed next.

Additional Comments:

1. I believe it is a good program for people that are shy and don't talk much. It helps them learn at their own pace.
2. I think I understood better than I would in a classroom.
3. The information seemed logical and to the point.
4. The instructions and directions were very clear and precise.
5. You get to understand what is going on better and do at your own pace.
6. The instructors were very nice and always asked if we needed help to let them know.
7. I am more of a visual learner and need to actually see it done.

Conclusions and Recommendations

The Multimedia Approach to Self-Paced Individualized Instruction in Automotive Mechanics and Other Vocational Programs has been successful in that it has identified a specific need--using multimedia to approach individualized teaching. Instructional materials have been developed by the Project Coordinator and put into use at Ozarka Vocational Technical School. All copies of videotapes and programmed instruction materials have been sent to Dr. Bruce Simpson, Little Rock, for statewide dissemination.

Through student evaluation the program personnel were able to assess the value of the programmed instruction and found development errors that were corrected. By having the students progress through the LAPs and complete the evaluation forms, the project personnel were able to get feedback on spelling and punctuation errors, along with unclear directions and other problems that the students were having.

The project provided a variety of media uses that greatly benefited the special needs student, both on the below and above-average scales.

The strengths of this project included:

1. Full support of the school's administrative staff,
2. Cooperation from all instructors,
3. Good equipment, and
4. An enthusiastic Project Director and Coordinator.

During the implementation stages of this project, personnel from other vocational-technical schools in Arkansas came to Ozarka to observe this model (see Appendix J).

The following principles were considered by project personnel as the learning materials were developed:

1. Simplicity is important,
2. The composition of the materials needs to be kept at the learning level of the students.
3. Quality materials should be used, i.e. videotapes, etc.
4. The program instructor should have final approval of all learning materials.
5. As many teaching techniques as possible should be used.
6. Programmed instruction materials should be written immediately after the videotape is produced.

Program personnel recommend the following:

1. Incorporate as many available resources as possible into the LAPs.
2. Coordination between the instructor and the person operating the videotape camera is vital.
3. The person operating the videotape camera should focus on the chalkboard or whiteboard diagrams instead of filming mainly the instructor.
4. Basic skills should be incorporated into the technical material.
5. Filmstrips or computer programs can eliminate some programmed instruction.
6. Design the learning materials around the objectives of the unit.
7. State the objective of the unit at the beginning of the unit.
8. Interaction between the student and the resource person should be maintained, i.e. built-in check points.

Project personnel found that in addition to the stated project objectives there were other benefits:

1. The material was beneficial for students who were absent from class on the day(s) when the instructor originally presented the material.

2. Because of their involvement in the project, program instructors had the opportunity for self-evaluation, organization, and improvement of teaching techniques.

3. The LAPs were developed in the individual instructor's own style, teaching techniques, and applications; therefore, it was not necessary for the student to adapt to someone else's methodology.

4. The tendency to put limitations on special needs students was eliminated.

5. Students were able to progress on their own, possibly beyond the average potential of the class.

All students enrolling at Ozarka Vocational Technical School, regardless of the date they entered or their competency level, are able to receive the same course material through the self-paced individualized instruction developed as a result of this project. In addition, students can progress at their own rate through their training programs.

APPENDIX A

MANAGEMENT SYSTEM

INDIVIDUALIZED PLAN

Name:Ms MARGARET MAJORS Grade:16 ID: 555555555
Facility:PUBLIC Facility number:50 Plan Code(s): 165

Plan Code: 165

MANAGEMENT SYSTEM
for
SELF-PACED INSTRUCTION
in
AUTOMOTIVE SERVICE TECHNOLOGY

This is a training guide listing the training competencies you are to complete in this QUARTER. (X) will indicate mastery of the competency

Following each competency is a list of instructional materials available at OZARKA VO-TECH that can be used to help you in the field of AUTOMOTIVE SERVICE TECHNOLOGY. Your instructor will help you select materials that are most appropriate for you. GOOD LUCK!!!!

These materials are listed under the following abbreviations:

LSI (Lessons for Self Instruction) CAI (Computer Assisted Instruction
FSI (FilmStrip Instruction) BKS (Books) KIT (Kits)
VIDEO (Video Lessons) ACT (Audio Cassette Tapes)

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
MARGARET , for practice READING TECHNICAL MANUALS use these materials:
__FSI: MIND, Mechnanics, Reference/Forms:
1. Using Reference Sources, Table of Contents, Index,Headings
2. Tables/Charts
3. Diagrams
4. Manuals/Catalogs
__BKS: Reading Skills, Automotive: CH. 3: Textbook Reference Pages
__VIDEO:Tech Manuals (Automotive) with written lessons

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
MARGARET , for practice FILLING OUT FORMS, use these materials:
__FSI: MIND, Mechanics, Reference/Forms:
5. Filling In & Understanding Forms

MARGARET , for practice using FORMULAS, use these materials:
__BKS: Math for Automotive Technology
CH. 8: Formulas

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
MARGARET , for practice in AUTOMOTIVE MEASUREMENTS, use these materials:
__BKS: Math for Automotive Technology
CH. 5: Measurement

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]

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MARGARET , for understanding of BASIC ENGINE PARTS, use these materials:
__CAI: MIND, Mechanics, General Operating Principles:
1. Basic Engine Parts
2. Connecting Engine Parts
__ MIND, Words at Work, Mechanics:
2. Basic Engine Parts

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
MARGARET , for understanding of ENGINE OPERATING PRINCIPLES, use these:
__CAI: MIND, Mechanics, General Operating Principles:
3. Operating Principles-Four Stroke
4. Engine Cycle-Four Stroke Crankshaft Degrees
__ MIND, Mechanics, Cloze Review Questions:
2. Operating Principles
__ MIND, Words at Work, Mechanics:
1. Basic Engine Series

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
More ENGINE OPERATING PRINCIPLES:
__VIDEO: Piston Engine Operations (Automotive) with written lessons

MARGARET , for knowledge of the COOLING SYSTEMS, use these materials:
__CAI: MIND, Mechanics, Cooling Systems:
1. Cooling System
2. Cooling System Operation
__ MIND, Mechanics, Cloze Review Questions:
3. Engine Cooling

MARGARET , for knowledge of the LUBRICATION SYSTEMS, use these materials:
__CAI: MIND, Mechanics, Lubrication:
1. Automotive Lubrication System
2. Procedures for an Oil Change

MARGARET , for knowledge of BASIC ELECTRICAL CIRCUITS, use these materials:
__CAI: MIND, Mechanics, Electrical Circuits:
1. Basic Electrical Circuit

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
MARGARET , for knowledge of the FUEL SYSTEMS, use these materials:
__CAI, MIND, Mechanics, Fuel System Carburetors:
1. Fuel Systems
2. Introduction to the Carburetor
3. Carburetor Circuits, Part I
4. Carburetor Circuits, Part II
5. Carburetor Circuits, Part III

MARGARET , for knowledge of the IGNITION SYSTEMS, use these materials:
__CAI: MIND, Mechanics, Ignition Systems:
1. Advance Mechanisms, Part I
2. Advance Mechanisms, Part II
3. Ignition System Point Type
4. Spark Plug

MARGARET , for knowledge of EMISSION CONTROL SYSTEMS, use these materials:

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MARGARET , for knowledge of AUTOMOTIVE ELECTRICAL SYSTEMS, use these:
__CAI: MIND, Mechanics, Electrical Circuit:
1. Basic Electrical Circuit
MIND, Words at Work, Mechanics:
3. Electrical Systems

MARGARET , for knowledge of LIGHTING SYSTEMS, use these materials:

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
MARGARET , for and understanding of BASIC ELECTRICITY CONCEPTS, use these:
__CAI: MIND, Basic Electronics, DC Circuits:
1. Basic Electronic Theory
2. Direct Current Circuits
3. Resistance in DC Circuits
__ACT: Electricity (IET):
CH. 1: Basic Concepts
CH. 2: Quantities and Units

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
More BASIC ELECTRICITY CONCEPTS:
__ACT:Electricity & Controls for Heating, Ventilating, Air Cond.(MAS)
CH. 1: Basic Electricity
__BKS:Basic Electricity for Appliances (MAS) with written lessons
CH. 1: Fundamentals
FOS, Fundamentals of Service (AM)
CH. 1: Electricity-How it Works

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
__BKS: Electricity-Electronics Fundamentals
CH. 1: Electricity
CH. 2: Resistance
CH. 3: Voltage
CH. 4: Direct Current
__VIDEO: Basic Electricity, Tape 1 with written lessons

Ms MARGARET MAJORS has met all the criteria for the following listed activity. [X]
__VIDEO: Basic Electricity, Tape 1 with written lessons
Basic Electricity, Tape 2 with written lessons

MARGARET , for an understanding of OHM'S LAW, use these materials:
__CAI: MIND, Basic Electronics, DC Circuits:
4. Ohm's Law
__BKS: Electricity-Electronics Fundamentals
CH. 2: Ohm's Law
__VIDEO:Basic Electricity, Tape 2 with written lessons
5. Ohm's Law

MARGARET , for knowledge of ELECTRICAL CIRCUITS, use these materials:
__ACT: Electricity (IET):
CH. 3: Basic Circuits, Laws, and Measurements
CH. 4: Circuit Components
CH. 5: Multiple Load Circuits
CH. 6: Complex Circuit Analysis

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BKS: Basic Electricity for Appliances (MAS) with written lessons:
CH. 2: Direct Current

More ELECTRICAL CIRCUITS materials:
__BKS: Electricity-Electronics Fundamentals:
CH. 6: Parallel Circuit
CH. 7: Series-Parallel Circuit
__ Electricity 1:
2. Circuits
__VIDEO:Basic Electricity, Tape 3 / Tape 4 with written lessons
7. DC Elec.Circuits, Pt.I / 8. DC Elec.Circuits, Pt. II

MARGARET , for an understanding of MAGNETISM, use these materials:
__ACT: Electricity (IET):
CH. 7: Magnetism
__BKS: Basic Electricity for Appliances (MAS) with written lessons:
CH. 3: Magnetism
__ Electricity-Electronics Fundamentals:
CH. 10: Magnetism/Electromagnetism
__VIDEO:Basic Electricity, Tape 3: 6. Magnetism

MARGARET , for knowledge of ELECTRICAL MEASUREMENT DEVICES, use these:
__BKS: Electricity-Electronics Fundamentals:
CH. 8: Kirchhoff's Laws
CH. 9: Troubleshooting Resistive Circuits
CH.11: Voltmeter Circuit & Loading Effects
CH.12: Power & Its Measurement
__ Electricity I:
1. Devices 3. Materials

More ELECTRICAL MEASUREMENT DEVICES:
__BKS: Electricity 3:
1. DC Motors & Generators
2. Controls
3. Transformers
__VIDEO:Basic Electricity, Tape 4 with written lessons
8. Inductance/Capacitance, Part I

More ELECTRICAL MEASUREMENT DEVICES:
__VIDEO: Basic Electricity, Tape 5:
__ Basic Electricity, Tape 6:

SIGNATURE OF PERSON COMPLETING THE ABOVE SECTIONS

Name_____ Title_____Date__/__/__.

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APPENDIX B

RESOURCE INVENTORY FOR
AUTOMOTIVE MECHANICS
AND FOOD SERVICES

NON-PRINT INVENTORY

	TITLE	FORMAT	PROGRAM
1)	Index for Automotive Service & Repair; 1981 Edition Mitchell Manuals Inc., A Cordura Company	Microfiche	Service and Repair
	(Below 2-6 are Programmed Instruction Modules)		
2)	DC Electronics; 1982 by Heathkit	Cassette tapes (2) Audio-Visual	Electronics
3)	Electrical Fundamentals and Batteries- U-1 Heathkit Fundamentals of Troubleshooting -U-2	Audio-Visual	Electronics
4)	Charging System -- Fundamentals -U-3 Heathkit Servicing -U-4	Audio-Visual	Electronics
5)	Starting System - Fundamentals U-5 Heathkit Servicing U-6	Audio-Visual	Electronics
6)	Accessories and Body Electrical- Fundamentals U-7 Heathkit Servicing U-8	Audio-Visual	Electronics
	(Below 7-11 - Transparency Programs Produced by Ford Motor Company		
7)	Alternators-Principles of Operation Course #3101-105 TRN	Transparencies	Electronics
8)	Alternator Charging System Diagnosis, Adjustment, & Overhaul -Course #3101-207 TRN	Transparencies	Electronics
9)	Ford 2 and 4 Barrel Carburetors Complete Service Course #2400-009	Transparencies	Fuels
10)	Transmissions #1611-104, #1715-106, #1705-104 #1710-103	Transparencies	Drive Train
11)	Starting System Course # 10004	Transparencies	Electrical

NON-PRINT INVENTORY

	TITLE	FORMAT	PROGRAM
12)	Air Conditioning Training Program 1975 008470-0800-2 Mitchell Manuals, Inc	Audio-Visual Slides and cassettes	Air Conditioning
13)	Starting System-General Motors #9025-FC	Filmstrips (Also on video cassette	Electronics
14)	Ignition Systems by General Motors #9024-FC #9020-FC	Filmstrips (Also on video cassette)	Electronics
15)	Charging System by General Motors #9011_FC #9026_FC	Filmstrips (Also on video cassette)	Electronics
16)	Ford and GM Computor Control -1984 Prentice Hall Media, Inc.	Audio-Visual Filmstrip- cassette	"
17)	Basic Engine Ignition Systems 1973-1985 Ford Motor Company	Slide programs	"
18)	Electronic Fuel Injections, 1984 Ford Motor Company	Slide programs	"
19)	Turbo Chargers, 1983 Ford Motor Company	Slide programs	"
20)	Using the Engine Analyzer Ford Motor Company	Filmstrip and Cassette	"
21)	Sun Test Equipment Training Films For Engine Analyzer	Video-Cassettes	"
22)	Daily Classroom Lectures	Video and Cassettes	"

VOCATIONAL RESOURCE INVENTORY FOR AUTO MECHANICS

ISBN	TITLE (Include edition #, if any)	PROGRAM
0-07-057151-1	Electronic Communication, Fifth Ed.; Robert L. Shrader; 1985 McGraw-Hill, Inc., Dallas, TX	Electronics
0-8359-0311-7	Automotive Electronics and Engine Performance; 1984; Davis Dales & Frank Thiessen; Reston Pub. Co., Inc., A Prentice-Hall Co., Reston, VA	Electronics
0-13-054601-1	Automotive Electrical Reference Manual; 1983; Don Westland; Prentice-Hall, Inc., Englewood Cliffs, NJ 17632	Electronics
0-13-054693-3	Automotive Computers and Control Systems; 1984; Tom Weathers, Jr. & Claud C. Hunter; Prentice-Hall, Inc., Englewood Cliffs, NJ 17632	Electronics (Emissions)
0-8470-1133-X	1981 Ed. Computerized Engine Controls, Diagnosis , and Testing; Mitchell Manuals, Inc.; A Cordura Co.; San Diego, CA 92126	Electronics (Emissions)
0-8470-1181-X	1983 Ed. Computerized Engine Controls, Diagnosis, and Testing; Mitchell Manuals, Inc., A Cordura Co., San Diego, CA 92126	Electronics (Emissions)
	Computerized Engine Controls, Diagnosis, & Testing; 3rd Ed., 1984 Napa Echlin by Motor; The Hearst Corp.	Electronics (Emissions)
0-07-016501-7	Automotive Ignition Systems: Diagnosis & Repair; Frank C. Derato; 1982 McGraw-Hill; Dallas, TX	Ignition Systems
0-07-002857-5	Principles of Wheel Alignment Service, Third Ed. E. Miles Bacon; 1985 McGraw-Hill Book C., Dallas, TX	Wheel Alignment
0-13-054288-1	Automotive Suspension, Steering, and Brakes; Herbert E. Ellinger: 1980 Prentice-Hall, Inc. Richard B. Hathaway	Suspensions
0-13-05477-5 (2 copies)	Automatic Transmissions, Second Ed.; Mathias F. Brejcha; 1982 Prentice-Hall, Inc. Englewood Cliffs, NJ 07632	Drive Train
0-8019-5224-7	Carburetors & Carburetion, Walter B. Larew; 1973 Chilton Book Co., Radnor, PA	Fuels
(Approx. 50 copies)	Technical Service Highlights; Ford Training Pulbications Dept. (Misc.)	Misc.

VOCATIONAL RESOURCE INVENTORY FOR AUTO MECHANICS

ISBN	TITLE (Include Edition #, if any)	PROGRAM
(Approx. 20 copies)	General Motors Brake Manuals (Misc.)	Suspensions
0-471-71645-6	Brakes by John Remling; 1978 John Wiley & Sons, NY	Suspensions
	Vocational Trade and Industrial Education Auto Mechanics, Vol. 1- 1978 Mid-America Vocational Curriculum Consortium, Inc.	Complete Automotive Outline
	Vocational Trade and Industrial Education Auto Mechanics, Vol II Mid-America Vocational Curriculum Consortium, Inc.,Stillwater, OK	Complete Automotive Outline
	(Below are from CHilton Book Co., Chilton Way; Radnor, PA 19089	
0-8019-7390-2	Automatic Transmission Manual 1980-1984 Professional Mechanic's Edition	General
0-8019-7495-X	Automotive Service Manual- 1985 Professional Mechanics Edition	General
0-8019-7161-6	Automotive Service Manual 1983 Professional Mechanics Edition	General
0-8019-7595-6	Import Automotive Service Manual, 1985 Professional Mechanics Edition	General
0-8019-7545-X	Electronic Engine Controls Manual 1978-1985 Professional Mechanics Edition	General
0-8019-7497-6	Emission Diagnosis and Service Manual 1984 With Vacuum Circuits by Professional Mechanics Edition	General
0-8019-5649-8	1961-71 Truck Repair Manual 1974	General
	1970-75 Wiring Diagrams Manual	Electronics

VOCATIONAL RESOURCE INVENTORY FOR AUTO MECHANICS

ISBN	TITLE (Include Edition #, if any)	PROGRAM
	1978-83 Wiring Diagrams Manual	Electronics
	1982-84 Wiring Diagrams Manual	Electronics
	Below are from Motor, 224 W. 57th St., NY 10019	
0-87851-546-1	1953-61 Auto Repair Manual	General
0-910992-7	Auto Repair 1962-68	General
0-910992-46-0	Auto Repair 1976 39th Edition	General
0-87851-540-2	Auto Repair 1982 45th Edition	General
0-87851-590-9 (2 copies)	Auto Repair 1979-1985 48th Edition	General
0-87851-560-7	Emission Control Manual 3rd Edition 1982	Emission Controls
0-87851-543-7	Imported Car Repair Manual 4th Edition 1981	General Import
	Imported Car Repair Manual 1985	General Import
0-87851-519-4	Automatic Transmission 8th Edition 1979	Drive Train
0-910992-43-6	Automatic Transmission 6th Edition	Drive Train

VOCATIONAL RESOURCE INVENTORY FOR AUTO MECHANICS

ISBN	TITLE (Include Edition #, if any)	PROGRAM
	Below are by Mitchell Manuals, Inc. San Diego, CA 92126	
0-8470-0874-6	Domestic Car Tune-up Mechanical Service and Repair 1984	General
0-8470-0868-1	Domestic Car Tune-up Mechanical Service and Repair 1978	General
0-8470-5750-X	1975 Import Tune-up	General Import
0-8470-0705-7	1965-75 National Service Data Domestic Mechanical	General
	Imported Mechanical 1975	General
	Import Tune-up 1975	General Import
0-8470-0704-9 I 0-8470-o7o4-9 II	Tune-up 1975 Domestic	General
	Domestic Transmissions 1975	General
0-8470-7569-9 0-8470-7570-2	Vol. II. Emission Control Service Repair 1984 Vol. III.	General
0-8470-1238-7 0-8470-1238-7	Vol. III. Electrical Service & Repair 1984 Vol. IV.	General
	Domestic Interchange Service 1975	General
0-8470-0323-X	Domestic Interchange Service 1984	General

VOCATIONAL RESOURCE INVENTORY FOR AUTO MECHANICS

ISBN	TITLE (Include Edition #, if any)	PROGRAM
0-8470-5786-3	Transmission Service and Repair 1977 Imported Cars and Trucks	General Truck
	Mechanical Manual 1977 Domestic Trucks 1965-1976	General Truck
	Tune-up 1977 Domestic Trucks	General Truck
	Transmission 1977 Domestic Trucks	General Truck
0-87851-524-0	Truck and Diesel Repair 1980 Motor 1790 Broadway, NY 10019	General Truck
0-910992-48-7	Truck and Diesel Repair Motor 1790 Broadway, NY 10019 1980	General Truck
	General Motors Annual Repair Manuals 1974-1983	General
	Ford Motors Annual Repair Manuals 1977-1982	General

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICES

TITLE	LOCATION
Principles of Food and Beverage	Library
Restaurant Survival Kit for the 80's	Library
Profitable Foodservice Management	Library
Food Service Planning - Layout and Equipment	Library
Food Additives Tables	Library
Quantity Food Preparation	Library
Quick - Quick Type for Typewriter or Computer	Library
Bakery Specialties	Library
All About Bookkeeping; A Guide for the Small Business	Library
Starting a Small Restaurant	Library
Quality Control in the Food Industry	Library
Food Service Equipment	Library
Standards for Fats and Oils	Library
Food Service Facilities Planning	Library
The Chef's Compendium of Professional Recipes	Library
Cakes, Icings, and Cheese Cakes	Library
Computer Systems for Foodservice Operations	Library

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICES

TITLE	LOCATION
The Theory of Catering	Library
Frozen Food Encyclopedia for Food Service	Library
Fast Food Marketing	Library
Food Service Marketing	Library
Breadmaking and Flour Confectionary	Library
Food Equipment Facts	Library
Food and Beverage Service	Library
Purchasing for Food Service Managers	Library
Menu Planning	Library
Sale and Purchase of Restaurant	Library
Quality Control in Food Service	Library
Food Service Systems Management	Library
Nutritional Guide to Fast Foods	Library
Dir. of Food and Nutrition Information Services and Resources	Library
Professional Baking	Library
Food Values	Library
Managing Service in Food and Beverage Operations	Library

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICE

TITLE	LOCATION
Appetizers, Salad Dressings, and Salads	Library
Breads, Pastries, Pies, and Cookies	Library
Menus: Analysis and Planning	Library
Standardizing Foodservice for Quality and Efficiency	Library
Menu Design: Merchandising and Marketing	Library
Guide to Kitchen Management	Library
Promotion in Food Service	Library
Planning and Serving Your Meals	Library
The Hospitality Industry	Library
Focus on Food	Library
Food Production, Management, and Services: Management	Bookstore
Food Service Production and Service	Bookstore
Food Production, Management, and Service: Baking	Bookstore
Food Production, Management, and Service: Production	Bookstore
Food Production, Management, and Service: Fast Food	Bookstore
Food Production, Management, and Service: Service	Bookstore
Bakery Production and Marketing	Lab Area (E.N.)

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICES

TITLE	LOCATION
Hubert Idea Book 1984	Lab Area (E.N.)
Practical Baking	Lab Area (FS)
Guide to Modern Meals	Lab Area (FS)
Practical Baking	Lab Area (FS)
Effective Classroom Management	Lab Area (E.N.)
Cooking the Professional Way	Lab Area (E.N.)
Meat Handbook	Lab Area (FS)
Menu Planning and Foods Merchandising	Lab Area (E.N.)
University of New Orleans General Catalog 1979-80	Lab Area (FS)
Promotion in Foodservice	Lab Area (E.N.)
American-Hotel Register Company	Lab Area (FS)
The Good Housekeeping Cookbook	Lab Area (E.N.)
Classical Cooking the Modern Way	Lab Area (E.N.)
Guide to Modern Meals	Lab Area (FS)
The Professional Chef	Lab Area (FS)
Food Safety and Sanitation	Lab Area (FS)
Let's Cook it Right	Lab Area (E.N.)

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICES

TITLE	LOCATION
Professional Restaurant Service (2 copies)	Lab Area (FS)
Food Preparation	Lab Area (FS)
Math Principles for Food Service Occupations	Lab Area (FS)
Food Service Management	Lab Area (FS)
Focus on Food	Lab Area (FS)
Food Service Careers Student Guide (2 copies)	Lab Area (FS)
U.S. Airforce Cooking, Serving, and Baking	Lab Area (E.N.)
Food for 50	Lab Area (FS)
Introduction to Hotel and Restaurant Management	Lab Area (FS)
Practical Baking Manual	Lab Area (FS)
Obstkuchen Obsttorten	Lab Area (E.N.)
Das Beyer Koch Buch	Lab Area (E.N.)
The Vitamin Book	Lab Area (E.N.)
Cooking for a Crowd	Lab Area (E.N.)
Quick and Easy Gourmet Recipes	Lab Area (E.N.)
Betty Crocker Bookbook for boys and Girls	Lab Area (E.N.)
Amana Radarange Cookbook	Lab Area (E.N.)

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICES

TITLE	LOCATION	
McCall's Cookbook	Lab Area (E.N.)	
Our Favorite Salads	Lab Area (E.N.)	
Billy Joe Tatum's wild foods Cookbook and Field Guide	Lab Area (E.N.)	
Better Homes and Gardens Barbeque Book	Lab Area (E.N.)	
Fun with Cooking	Lab Area (E.N.)	
The Saturday Evening Post Family Cookbook	Lab Area (E.N.)	
Better Homes and Gardens BBQ and Picnics	Lab Area (E.N.)	
Glorious Eating for Weight Watchers	Lab Area (E.N.)	
Pasta	Lab Area (E.N.)	
ASU - Beebe Branch Catalog 1986-1988	Lab Area (E.N.)	
The Presbyterian Women's Cookbook	Lab Area (E.N.)	
Sharp Carousel Microwave	Lab Area (E.N.)	
Focus on Frozen Foods	Lab Area (E.N.)	
West Haven School Cookbook	Lab Area (E.N.)	
Pork for Glorious Dini[illegible]	Lab Area (E.N.)	
Four Course Meal	Lab Area (FS)	V. Tape
Desert Bar	Lab Area (FS)	V. Tape

VOCATIONAL RESOURCE INVENTORY FOR FOOD SERVICES

TITLE	LOCATION	
Critics Choice Parts 1 & 2	Lab Area (FS)	FILM
Ingredients for Stardom Parts 1 & 2	Lab Area (FS)	FILM & TAPE
Purchasing Systems	Lab Area (FS)	FILM & TAPE
Italian Cooking	Lab Area (FS)	FILM
How do you Account for That	Lab Area (FS)	FILM
Princess in Disquise	Lab Area (FS)	FILM & TAPE
Methods of Meat Cookery	Lab Area (FS)	FILM & TAPE
California Summer Fruits	Lab Area (FS)	FILM
Chinese Cooking	Lab Area (FS)	FILM
# 2 Meat Identification	Lab Area (FS)	TAPE
NLAE # 4 Meat Identification	Lab Area (FS)	SLIDES & TAPE
NLAE #8 Herbs & Spices	Lab Area (FS)	SLIDES & TAPE
Braising and Stewing	Lab Area (FS)	FILM
Rush Hour Service	Lab Area (FS)	FILM
Presentation of Food and Beverage	Lab Area (FS)	FILM
Taking the Order	Lab Area (FS)	FILM
Food Purchasing Part 1 & 2	Lab Area (FS)	FILMS
1 Slide Carousel	Lab Area (FS)	

APPENDIX C

LEARNING ACTIVITY PACKAGE CHECKLIST

LEARNING ACTIVITY PACKAGE CHECKLIST

_____1. Materials Checklists

_____2. Activity Guides

_____3. Labels and numbers

_____4. Pre and Post Tests

_____5. Answer Sheets

_____6. Video Tape(s)

_____7. Title Page

_____8. Introduction

APPENDIX D

SAMPLE LEARNING ACTIVITY PACKAGE

OZARKA VO-TECH SCHOOL

P.O. BOX H

MELBOURNE, ARKANSAS

STUDENT LEARNING GUIDE

COURSE TITLE: Food Services

UNIT: Prepare, Cook, and Serve

COMPETENCY: Prepare Split Pea Soup

INTRODUCTION: There are as many varieties of soup as one can think of ingredients to put in them. There are different versions of Split Pea Soup. This soup has the robust flavor of ham and the blend of several vegetables and flavors. It is a delicious blend of savory foods and a real treat to the taste buds.

You are now ready to start your study on Split Pea Soup.

PERFORMANCE OBJECTIVE: Given the proper equipment, tools, and ingredients, you will prepare a recipe of split pea soup from start to finish, scoring 100% accuracy on the final evaluation form.

PERFORMANCE ENABLERS: To properly prepare the above, you will name all the ingredients and use the step by step method of preparation.

PREREQUISITE: You will need to know how to read a recipe, know your units of measurement, and know how to follow directions.

NOTE: View the video tape on "Split Pea Soup".

LEARNING EXPERIENCE NO. 1

INGREDIENTS AND DIRECTIONS FOR PREPARATION OF SPLIT PEA SOUP

LEARNING EXPERIENCE	SPECIAL INSTRUCTIONS
Study the information sheet below.	When you have finished studying the information sheet, turn to the next page and name all the ingredients listed for making Split Pea Soup.

INFORMATION SHEET

Ingredients in Split Pea Soup:

STEP 1: 1½ pounds cubed ham
3 ounces fine diced carrots
4 ounces fine diced celery
4 ounces fine diced onions
1 bay leaf
½ teaspoon black pepper
1 tablespoon beef base
12 cups water
4 cups split peas

STEP 2: 1½ pounds raw small diced potatoes
4 cups water
salt to taste

Place all the ingredients in step one in a large pot and bring to a boil. After the mixture starts to boil, turn down to simmer for 1½ hours.

Add the potatoes and water in step two and let the entire mixture slow cook for another.30 minutes. Salt to taste.

NOTE: If no ham is available, you can fry 1 pound of bacon until crisp. Add the fat and bacon to the soup. If you wish to have the soup meatless, add 3 drops of liquid smoke to get the ham or bacon taste.

PRACTICE ACTIVITY:

Directions: List all the ingredients needed for making Split Pea Soup.

STEP 1:

1.
2.
3.
4.
5.
6.
7.
8.
9.

STEP 2:

1.
2.
3.

To check your work, turn to the next page.

PRACTICE ACTIVITY SELF EVALUATION

The proper ingredients for making Split Pea Soup are given below.

Step 1:

1. ham
2. carrots
3. celery
4. onions
5. bay leaf
6. black pepper
7. beef base
8. water
9. split peas

Step 2:

1. potatoes
2. water
3. salt

If you missed any of the ingredients, go back to the information sheet on Learning Experience No. 1 and review the ingredients. Then you may go back and work the practice activity on ingredients again.

If you do not miss any of the ingredients, go on to Learning Experience No. 2.

LEARNING EXPERIENCE NO. 2.

Using your information about Split Pea Soup and the recipe given, you will prepare from scratch a recipe of Split Pea Soup.

PERFORMANCE CRITERIA: You will score a minimum of 50 out of 50 points on this evaluation.

EVALUATION CRITERIA	POINTS DEDUCTED
Soup mixture scorched--heat left too hot	20
Split Peas not done	15
Potatoes mushy--put into mixture too soon	15
TOTAL POINTS OF THIS EVALUATION	50
TOTAL POINTS DEDUCTED	_____
SCORE OF THIS EVALUATION	_____

If you score less than 50 points on this evaluation, go back and repeat your learning experience again. You may check with the instructor.

Ask the instructor to evaluate your work and see if you pass the final performance criteria for this competency.

APPENDIX E

PRETESTS

INDUCTANCE AND CAPACITANCE

PRETEST

DIRECTIONS: Below are given a number of statements, each followed by three or more phrases, only one of which is correct. Find the one that completes the statement and place it on the numbered answer sheet.

1. Which of the following will increase the induct value of a coil?

   A. Increase number of turns of wire on the coil
   B. Insert a soft iron core
   C. Insert a core that has high permeability
   D. All of the above
   E. None of the above

2. A capacitor stores:

   A. Electrical energy
   B. Magnetic energy
   C. Mechanical energy
   D. Chemical energy

3. A capacitor used to be referred to as a (an):

   A. Condenser
   B. Generator
   C. Motor
   D. Insulator

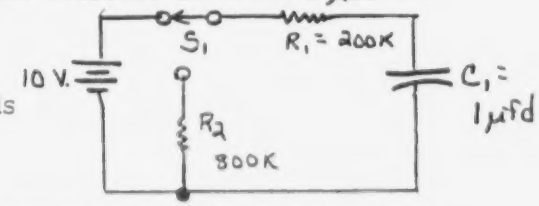
4. The dielectric in a capacitor is the:

   A. Conductor
   B. Generator
   C. Insulator
   D. Condenser

5. Which of the following will increase the value of the capacitor?

   A. Increase the plate area
   B. Increase the area between the plate
   C. Use air as a dielectric
   D. All of the above

6. Refer to the diagram here. With the switch in the position shown, C_1 starts charging to the applied voltage. The RC time constant is 200 X 1 μfd = :



A. .02 seconds
B. 1 second
C. 200 milliseconds
D. 2 seconds

7. For all practical purposes, the voltage across the capacitor in the above diagram will be 10 volts after how many time constants?

A. 5
B. 7
C. 6
D. 4

8. What is the total inductance of a circuit if three 20 mH inductors are connected in series in the circuit?

A. 6.3 mH
B. 20 mH
C. 45 mH
D. 60 mH

9. What is the total inductance of a circuit that contains four 40 mH inductors connected in parallel?

A. 15 mH
B. 10 mH
C. 160 mH
D. Total inductance cannot be determined from the information given

10. An inductor stores electrical energy in the form of:

A. A magnetic field
B. An excess of electron at one terminal and a surplus at the other
C. An electrostatic field
D. A counter EMF

11. Give the time constant in the following problems. Show the steps involved.

A. If the capacitance (C) is equal to 1 μfd and the resistance (R) equals 200 ohms, the time constant would be _____.

B. If C= 1 μfd and R= 100 kΩ; the time constant is : _____.

C. If C= 1 μfd and R=3 MΩ; the time constant is: _____.

INDUCTANCE AND CAPACITANCE

PRETEST ANSWERS

1. D
2. A
3. A
4. C
5. A
6. C
7. A
8. D
9. B
10. A
11. (a). t=R X C
t= 200 ohms X 1 μfd
t= 200 microseconds

(b). t= R X C
t= 100 kΩ X 1 μfd
t= 100 milliseconds

(c). t= R X C
t= 3 MΩX 1 μfd
t= 3 seconds

APPENDIX F

POSTTESTS

INDUCTANCE AND CAPACITANCE

POSTTEST

DIRECTIONS: Below are given a number of statements, each followed by three or more phrases, only one of which is correct. Find the one that completes the statement and place it on the numbered answer sheet.

1. Which of the following will not increase the inductance value of a coil?

   a. increase the number of turns of wire on the coil
   b. insert a soft iron core
   c. insert a core that has high permeability
   d. increase the current through the coil

2. A counter EMF is a voltage that:

   a. forces current counterclockwise in the circuit
   b. opposes the applied EMF
   c. aids the applied EMF
   d. cancels the applied EMF

3. An inductor stores electrical energy in the form of:

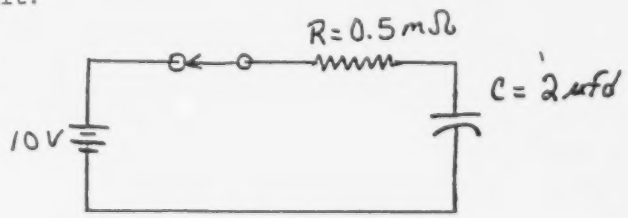
   a. an electrostatic field
   b. a magnetic field
   c. an excess of electrons at one terminal and a surplus at the other
   d. a counter EMF

4. Which of the following will decrease the value of a capacitor?

   a. increasing the area of the plates
   b. increasing the thickness of the dielectric
   c. decreasing the spacing between the two plates

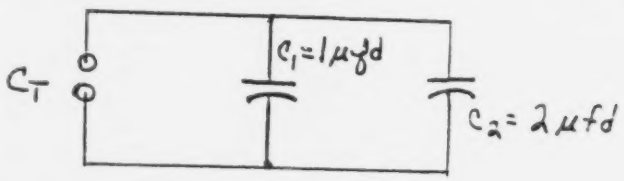
5. Refer to the diagram beside this question. What is the time constant of this circuit?

   a. 1 microsecond
   b. 1 second
   c. 2 seconds
   d. 0.5 seconds



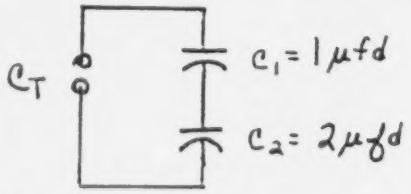
6. What is the total capacitance of the circuit in the diagram shown here?

a. 0.66 μfd
b. 1 μfd
c. 2 μfd
d. 3 μfd



7. What is the total capacitance of the circuit shown here?

a. .66 μfd
b. 1 μfd
c. 2 μfd
d. 3 μfd



8. The inductance of an inductor can be increased in two ways. These are:

a. increasing the number of turns in the inductor and winding the coil around an air core.
b. increasing the number of turns in the inductor and winding the coil around an iron core.
c. Decreasing the number of turns in the inductor and increasing the size of the air core.
d. Decreasing the number of turns in the inductor and winding the coil around an air core.

9. What is the total inductance of a circuit if three 15 mH inductors are connected in series in the circuit?

a. 5 mH
b. 15 mH
c. 45 mH
d. total inductance cannot be determined from the information given.

10. What is the total inductance of a circuit that contains four 60 mH inductors connected in parallel?

a. 15 mH
b. 60 mH
c. 240 mH
d. total inductance cannot be determined from the information given

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11. Of the four factors below that determine the capacitance of a capacitor, which is the least important?

    a. area of the plates
    b. distance between the plates
    c. type of dielectric material
    d. temperature

12. The amount of inductance which will induce an EMF of 1 volt into a conductor when the current changes at a 1 ampere per second rate is defined as one:

    a. Henry
    b. Farad
    c. Millihenry
    d. Microfarad

13. A formula which expresses capacitance in terms of charge and EMF is:

    a. $C = \frac{Q}{E}$

    b. $C = \frac{\quad}{\quad}$

    c. $C = \frac{\quad}{\quad}$

14. Give the time constant in the following problems. Show the steps involved.

    a. If the capacitance (C) is equal to 1 μfd and the resistance equals 100 ohms, the time constant would be _____.

    b. If C = 1 μfd and R = 10 kΩ ; the time constant is:

    _____

    c. If C = 1 μfd and R = 2 MΩ ; the time constant is:

    _____

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INDUCTANCE AND CAPACITANCE

POSTTEST ANSWERS

1. d
2. b
3. b
4. b
5. b
6. d
7. a
8. b
9. c
10. a
11. d
12. a
13. a
14. (a) t = R x C
    t = 100 ohms x 1 μfd
    t = <u>100 microseconds</u>

    (b) t = R x C
    t = 10 kΩ x 1 μfd
    t = <u>10 milliseconds</u>

    (c) t = R x C
    t = 2 MΩ x 1 μfd
    t = <u>2 seconds</u>

APPENDIX G

JOB SHEET

JOB SHEET

PREREQUISITES:

OBJECTIVE:

MATERIALS:

CRITERIA:

PERFORMANCE OBJECTIVES:

JOB SHEET
SERIES RESISTANCE
#1

PREREQUISITES:

1. View video "Using a Breadboard"
2. View video "Using a Simpson 260 Meter"
3. View video "Resistor Color Code"
4. Read "Resistors in Series" p. 3-18, DC ELECTRONICS

SERIES RESISTANCE FORMULA

$R_t = R_1 + R_2 + R_3$

R_t (total resistance)

OBJECTIVE: Upon completion of this job sheet, you will be able to successfully calculate, set up, and measure series resistive circuits.

MATERIALS: Calculator, Simpson 260 Meter, Archer Universal Breadboard, Pencil/pen, Paper, A selection of resistors

CRITERIA: The difference between the "CALCULATED VALUE" and the "MEASURED VALUE" should be no greater than 5%.

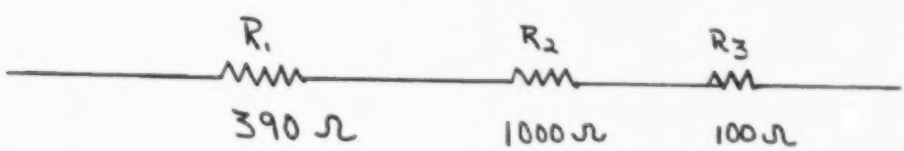
PERFORMANCE OBJECTIVES:

1. Using the formula for series resistance, figure the total resistance for the illustrated circuit and record it in the box labeled "CALCULATED VALUE".

   STEPS: a. Substitute values from the diagram into the formula.
   b. Add
   c. Record total resistance (R_t) in the proper box.

2. Using the appropriate materials and equipment, set up the circuit as illustrated and measure the total resistance. Record in the box labeled "MEASURED VALUE".

   STEPS: a. Select the appropriate resistors for the illustrated circuit.
   b. Set up the circuit on the breadboard according to the diagram.
   c. Using the meter, measure the total resistance and record in the proper box.



CALCULATED VALUE

$R_t =$

MEASURED VALUE

$R_t =$

NOTE: If your difference is greater than 5%, after double checking your work, view the Supplemental Video Tape # 1.

APPENDIX H

STUDENT EVALUATION FORM

STUDENT EVALUATION
Learning Activity Packages (LAPs)

SCHOOL _____ PROGRAM _____

For each of the following statements, indicate your answer by circling the number corresponding to your response and record any comments.

1. Strongly Disagree 2. Disagree 3. Not Sure 4. Agree 5. Strongly Agree

	Strongly Disagree	Dis-Agree	Not Sure	Agree	Strongly Agree
1. Learning is easier using the Learning Activity Packages (LAPs)	1	2	3	4	5

Comments _____

_____

2. Learning is faster using the LAPs. 1 2 3 4 5

Comments _____

_____

3. The instructor was available for assistance as needed. 1 2 3 4 5

Comments _____

_____

4. Information in the LAPs is arranged in a logical order. 1 2 3 4 5

Comments _____

_____

5. The LAPs are complete. (List any that are not). 1 2 3 4 5

Comments _____

_____

6. The instructions and directions for using the LAPs are clear. 1 2 3 4 5

Comments _____

_____

7. Visual aids (when applicable) made learning easier. 1 2 3 4 5

Comments _____

_____

8. The LAPs are about the right length. 1 2 3 4 5

Comments _____

(OVER)

PLEASE ANSWER THE FOLLOWING QUESTIONS:

A. What is the best thing about the Laps? _____

_____

_____

B. What is the worst thing about the Laps? _____

_____

_____

C. What is your overall opinion of the LAPs? _____

_____

_____

D. What error(s) did you discover in the LAPs? _____

_____

_____

ADDITIONAL COMMENTS:

APPENDIX I

LIST OF PRODUCED MATERIALS

VIDEO TAPES PRODUCED

LAPS
INCLUDED

1. Basic Electricity: "Composition of Matter"
"Current"
"Voltaage"
"Resistance"
"Ohm's Law"
"Using a Breadboard"; "Using a Simpson 260 Meter"; and "Resistor Color Code"
"Magnetism" -Part I
"Magnetism" -Part II
"DC Circuits"
"Capacitors"
"Inductance"

Tech Manuals

2. Food Services: "Four Course Meal"
"Waitress/Waiter
"Unit : Baking"
"Breads-Preparing Bread Without A mixer"
"Cinnamon Rolls"
"Cheesecake Ala Hella"
"Kitchen Safety" and "First Aid"
"Cross-Contamination"
"Personal Hygiene"
"Eiestich Soup"
"Black and White Cookies"
"Baked Alaska"
"Buttercream Torte"
"Pie Dough"
"Steak Rolls"
"Chicken and Dumplings"
"Lobster Newburg and Preparing Lobster"
"Breads"
"Vegetable Carving"
"Swedish Cucumber Salad"
"Veal Cordon Bleu"
"German Potato Pancakes"
"Quiche Lorraine"
"Soups"
"Sauces"
"Buttercreme Torte"

APPENDIX J

VISITATIONS FROM OTHER SCHOOLS

VISITATIONS

Date	Name	School
02-04-87	Tom Brown Margaret Purnell	Jonesboro Area Vo-Tech School
09-14-87	Linda Farrar Bill McGenee	Oil Belt Vo-Tech School
	John Boxely	Delta Vo-Tech School
11-23-87	Constance McDaniel Donna Hughes	Crowley's Ridge Vo-Tech School
03-15-88	Ester Gross	Pines Vo-Tech School
04-07-88	Susan Holopoff	Vocational & Technical Education Division Arkansas Department of Education
05-16-88	Constance McDaniel	Crowley's Ridge Vo-Tech School

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